

CLAIMS

1. A secondary electron detector, especially in a scanning electron microscope,
5 **characterized in that** it is comprised of a sensor (2) located in a detector chamber (3), to which a vacuum pump (10) is coupled to produce a vacuum inside the detector chamber (3), the detector chamber (3) being closed in the wall near to the active surface of the sensor (2) by a diaphragm featuring high resistance to a transmission of gas and a low resistance to a transmission of
10 **electrons, while all its remaining walls vacuum-tightly separate** the interior of the detector chamber (3) from the surrounding environment.
2. The secondary electron detector of claim 1, **characterized in that** the diaphragm featuring the high resistance to the transmission of gas and the low resistance to
15 **the transmission of electrons is constituted by an electrically conductive grid (11)** to which at least one source (16, 17) of bias voltage is connected.
3. The secondary electron detector of claim 2, **characterized in that** the electrically conductive grid (11) is made of copper.
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4. The secondary electron detector of claim 2, **characterized in that** the electrically conductive grid (11) is constituted by a diaphragm (12) made of electrically insulating material provided with orifices (13), the diaphragm (12) being fitted with
25 **the first conductive coating (14) on the side near to the sensor (2) and with the second conductive coating (15) applied to its reverse side, where the first conductive coating (14) is electrically insulated from the second conductive coating (15).**
5. The secondary electron detector of claim 4, **characterized in that** the diaphragm
30 **(12) is a capton diaphragm.**
6. The secondary electron detector of any of the foregoing claims 2 to 5, **characterized in that** the source (16, 17) of bias is a source of bias of 50 to 2000 V.

7. The secondary electron detector of claim 6, **characterized in that** the source (16, 17) of bias voltage is a source of bias voltage of 250 to 700 V.
8. The secondary electron detector of any of the foregoing claims, **characterized in**
5 **that** the sensor (2) consists of a light-guide (4), between whose input (6) and the electrically conductive grid (11) an ionization grid (25) is arranged that is connected to the source (26) of ionization voltage, while the light-guide output (4) leads to the photo-multiplier input.
- 10 9. The secondary electron detector of claim 8 , **characterized in that** the light-guide (4) is at its input equipped with a scintillator (7), whose surface that is near to the electrically conductive grid (11) is fitted with a conductive coating (8), to which a high voltage source (9) is connected.
- 15 10. The secondary electron detector of any of the foregoing claims, **characterized in that** the sensor (2) is constituted by a PIN diode.
11. Secondary electron detector of any of the foregoing claims, **characterized in that**
20 **the** sensor (2) is fitted with a metallic disk (23), to which a high a voltage source (9) and a current detector (24) are connected.
12. The secondary electron detector of any of the foregoing claims, **characterized in that** the electrically conductive grid (11) is covered outside the detector chamber (3) with an input screen (18), which is connected to a low voltage source (19) of
25 50 to 500 V.
13. The secondary electron detector of claim 12, **characterized in that** the electrically conductive grid (11) is outside the detector chamber (3) covered with an input screen (18), which is connected to the low voltage source (19) of 80 to
30 150 V.
14. The secondary electron detector of claim 12 or 13, **characterized in that** the input screen (18) is of hemispherical shape.

AMENDED CLAIMS

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Claim 1-14 replaced by claims 1-13.

C L A I M S

1. A secondary electron detector, especially in a scanning electron microscope,
5 **characterized in that** it is comprised of a sensor (2) located in a detector chamber (3), to which a vacuum pump (10) is coupled to produce a vacuum inside the detector chamber (3), the detector chamber (3) being closed in the wall near to the active surface of the sensor (2) by a diaphragm featuring high resistance to a transmission of gas and a low resistance to a transmission of electrons, while all its
10 remaining walls vacuum-tightly separate the interior of the detector chamber (3) from the surrounding environment, said diaphragm featuring the high resistance to the transmission of gas and the low resistance to the transmission of electrons being constituted by an electrically conductive grid (11) to which at least one source (16, 17) of bias voltage is
15 connected.
2. The secondary electron detector of claim 1, **characterized in that** the electrically conductive grid (11) is made of copper.
- 20 3. The secondary electron detector of claim 1, **characterized in that** the electrically conductive grid (11) is constituted by a diaphragm (12) made of electrically insulating material provided with orifices (13), the diaphragm (12) being fitted with the first conductive coating (14) on the side near to the sensor (2) and with the second conductive coating (15) applied to its reverse side, where the first conductive
25 coating (14) is electrically insulated from the second conductive coating (15).
4. The secondary electron detector of claim 3, **characterized in that** the diaphragm (12) is a capton diaphragm.
- 30 5. The secondary electron detector of any of the foregoing claims 1 to 4, **characterized in that** the source (16, 17) of bias is a source of bias of 50 to 2000 V.

6. The secondary electron detector of claim 5, **characterized in that** the source (16, 17) of bias voltage is a source of bias voltage of 250 to 700 V.
7. The secondary electron detector of any of the foregoing claims, **characterized in that** the sensor (2) consists of a light-guide (4), between whose input (6) and the electrically conductive grid (11) an ionization grid (25) is arranged that is connected to the source (26) of ionization voltage, while the light-guide output (4) leads to the photo-multiplier input.
8. The secondary electron detector of claim 7, **characterized in that** the light-guide (4) is at its input equipped with a scintillator (7), whose surface that is near to the electrically conductive grid (11) is fitted with a conductive coating (8), to which a high voltage source (9) is connected.
9. The secondary electron detector of any of the foregoing claims, **characterized in that** the sensor (2) is constituted by a PIN diode.
10. Secondary electron detector of any of the foregoing claims, **characterized in that** the sensor (2) is fitted with a metallic disk (23), to which a high a voltage source (9) and a current detector (24) are connected.
11. The secondary electron detector of any of the foregoing claims, **characterized in that** the electrically conductive grid (11) is covered outside the detector chamber (3) with an input screen (18), which is connected to a low voltage source (19) of 50 to 500 V.
12. The secondary electron detector of claim 11, **characterized in that** the electrically conductive grid (11) is outside the detector chamber (3) covered with an input screen (18), which is connected to the low voltage source (19) of 80 to 150 V.
13. The secondary electron detector of claim 11 or 12, **characterized in that** the input screen (18) is of hemispherical shape.